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Investigation of Psychometric Properties of Female Muscularity Scale

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ABSTRACT

Objective: The aim of this study was to investigate the psychometric properties of the Female Muscularity Scale (FMS). Method: Two different samples were determined to reach the research aim. The first of these is a sample of 153 female participants doing exploratory factor analysis. The second sample consisted of 213 women exercising with confirmatory factor analysis and additional analyzes. IBM SPSS Statistics 22 and AMOS 22 software were used in the analysis of the obtained data. Results: According to the results of Exploratory Factor Analysis, the two-factor structure was determined as attitude and behavior according to the results of exploratory factor analysis. As a result of the exploratory factor analysis conducted to test the construct validity of the inventory, 68% of the two-factor structure variance was determined. Internal consistency coefficients were calculated to test the reliability of the scale. Internal consistency coefficients obtained for 213 participants were 0.94 in the "Attitude" sub-scale and 0.92 in the "Behavior" sub-scale. The results of the Confirmatory Factor Analysis (x2 / sd (2.231) value, especially the index of fit, indicates that the model shows a good fit. The results of the confirmatory factor analysis conducted to test the construct validity of the scale showed that the indices of the scale, which consisted of two sub-scales, totaling 10 items, were acceptable. Conclusion: In conclusion, the results of the study revealed that the 10-item FMS is a useful scale for determining the level of drive for muscularity in the Turkish sample of female participants.

Key words: Drive for muscularity, Woman, Athletes, Female muscularity

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INTRODUCTION

Body image research focused primarily on women and the desire to achieve a slim physique widely [1]. Relatively little is known about the risk factors for body dissatisfaction in men and women [2]. Although relatively few men and women perceive their bodies as too large, traditional assessment methods may have underestimated the prevalence of body dissatisfaction in men [3]. One limitation of previous research is that evaluating desired body shapes cannot distinguish between increased fat in general and increased muscle mass [4]. Classical psychological theory suggests that there are three main categories of body structure: endomorph, mesomorph, and ectomorph. In the mesomorphic category, a hyper mesomorphic or muscular mesomorphic subtype is defined, which means a "muscular" body shape characterized by the well-developed chest and arm muscles and broad shoulders tapering to a thin waist [5]. The vast majority of research on body image has ignored the hypermomatic or muscular mesomorphic body structure subtype that might be particularly relevant when investigating body image in men. In recent years, there has been increased interest in body image studies related to muscularity [6]. Increasing evidence suggests that many men have body image concerns and reported impaired self-esteem as a result of dissatisfaction with their bodies [3,7]. Women often try to lose weight, while men often try to increase their weight [3]. Indeed, research fhas shown that most men want to be more muscular and often assume a muscular appearance is more

attractive to women [8]. However, studies show that women tend muscularity in recent years [9].

One of the scales transferred to the context of women is the drive for muscularity scale. For example, the 15-item The Drive for Muscularity Scale (DMS) is a self-report measure that assesses the interest in gaining both weight and muscle mass [10]. However, although the scale was shown to have acceptable internal consistency among women (α=.82), the factor structure found in male samples was not supported in studies with women. So, there are no separate sub-scales for concerns and behaviors of muscularity or not [11]. In addition, this scale shows no relationship with body dissatisfaction criteria or self-esteem among female dissatisfaction and adolescent women and shows that muscularity concerns come short the valuation criteria [10,12]. This may be because the Drive for Muscularity Scale items especially emphasizes male muscularity. Similarly, the Swansea Muscularity Attitudes Questionnaire (SMAQ) evaluates the pathways associated with gaining muscularity to activities aimed at potentiating [6]. Since the SMAQ was originally designed for men, a version for women has been created by adapting the wording of the items to adapt the scale to more female views (e.g. by replacing the term masculine with the feminine). However, this adapted version failed to demonstrate the convergent validity with DMS and demonstrated low internal consistency, particularly for sub-scales measuring perceived benefits of muscularity [12]. As such, SMAQ is limited in its usefulness as an assessment tool for studying drive for muscularity among women.

The Drive for Muscularity Scale (DMS) evaluates the importance given to muscles, increasing muscularity, and behaviors that increase muscularity [13]. However, the scale showed only a small proportion of variance shared with a measure of desire for a muscular body and its association with lifting weight behavior reported in women was only minor to moderate. The fourth version of the Socio-Cultural Attitudes towards the Appearance Questionnaire, which includes the muscular body internalization sub-scale, was developed [14]. Although this sub-scale includes an item that assesses participation in muscle-building behaviors, the evaluated superstructure is not dissatisfaction or anxiety regarding personal muscle level and related behaviors, but support for ideal muscles shape. Therefore, adapting the scales originally developed for men, as demonstrated by the lack of incorporation with more general body image anxiety measures that may result from gender differences. Social ideals for assessing muscularity concerns and associated behavior among women appear to have limited success in generating a useful tool for muscularity [11]. For this reason, the previously developed muscularity scale may be the most appropriate scale to assess such anxiety through activities that traditionally follow male muscularity types and in women, such as weight training or bodybuilding [15]. However, most women do not want to gain more muscle mass. Because it contradicts the slim-ideal body understanding of a thin and toned female body. Distinguishing muscle mass and muscle tone can be particularly helpful in understanding women's concerns. Therefore, this scale, which evaluates muscle concerns specifically related to the female slim and athletic body ideal, including muscle tone, is essential to understanding the role these concerns play in body image dissatisfaction in women.

Consequently, the aim of this study was determined to examine the psychometric properties of the female muscularity scale in women who exercises.

METHOD

Two different samples were determined to achieve the research aim. The first of these is the sample group consisting of 153 female participants who exercises, in which the exploratory factor analysis is performed. The second sample is the sample group consisting of 213 female participants who exercises, in which confirmatory factor analysis and additional analyzes were performed.

PARTICIPANTS

For exploratory factor analysis, FMS was applied to women between the ages of 18-45 who exercises. Participants in the study were women from different exercise branches (swimming (n=14), pilates (n=13), reformer (n=20), walking (n=23), jogging (n=11), zumba (n=32), dance (n=20), extreme sports (n=7) and fitness (n=13)). The average of the experiences

of women participating in the study is 4.53 ± 2.917 years.

For confirmatory factor analysis, FMS was applied to exercising women aged 19-48 years. Participants in the study were women from different exercise branches (swimming (n=14), pilates (n=43), reformer (n=29), walking (n=30), zumba (n=47), dance (n=22), and fitnesss (n=28)). The average of the experience of women participating in the study is 5.27 ± 3.816 years.

DATA COLLECTING TOOL

FMS is a scale developed by Rodgers et al. [9] to evaluate the psychometric properties of the female muscularity scale in women who exercises. The scale is a 5-point Likert-type scale (1=Strongly disagree-5=Strongly agree) consists of 10 items.

TRANSLATION PROCESS

In the process of translating the scale into Turkish, the standard "translation-back translation" method suggested by Brislin et al. [16] was used. The scale was translated from English to Turkish and then back to English with this method. The scale was separately translated from English to Turkish by two experts working in the field of English linguistics. The items in the scales obtained were examined by these two experts and four experts from the field of physical education and compared with each other and items with the same translation were determined. Each translation type of the articles with the same translation and the items with different translations was given to the expert again and translated back into English. The accuracy of the translation was evaluated by comparing the reversed form with the original in terms of meaning and form, and the scale was finalized. In the process of translating the scale into Turkish, a new expression was not developed, it completely adhered to its original form. In addition to demographic characteristics of the participants such as age, height and weight, a 6-item personal information form created by the researchers were used to determine how much, how often, and for how long they participated.

DATA ANALYSIS

IBM SPSS Statistics 22 and AMOS 22 package programs were used for the analysis of the data obtained after the application. First, Explanatory Factor Analysis (EFA) was used to examine the factor structure of the scale. Second, the accuracy of individual parameters was tested using the confirmatory factor analysis (CFA) results and then the suitability of the created high-level model was tested. In the CFA method, it was analyzed based on the Maximum Likelihood Estimations. Fit indices based on CFA, Chi-square-χ^2, Goodness of Fit Index (GFI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error Approximation (RMSEA), Comparative Fit Index (CFI), Normed Fit Index (NFI) is the Non-Normed Fit Index (NNFI). It is stated that RMSEA and SRMR values indicate a good fit in the range of 0-0.05 and acceptable fit in the range of 0.05-0.10; NNFI and CFI values between 0.97-1 indicate good fit and 0.95-0.97 indicate acceptable fit; NFI and GFI values between 0.95-1 indicate good fit and 0.90-0.95 acceptable fit. Secondly, the relationship between the sub-scale of the scale was examined with the Pearson correlation coefficient. Finally, to determine the reliability of a Likert-type scale, Cronbach's alpha values, which are the best way to test internal consistency, were examined in the study. Also, the test-retest method, which is an additional method for reliability, was also used. The final form was applied to 55 participants at 15-day intervals and examined with the Pearson correlation coefficient. The suitability of the number of participants was determined by Kaiser-MeyerOlkin (KMO). The KMO participant suitability coefficient obtained for this study is 0.88. The fact that the Chi-square value of the Barlett Sphericity test, which is used to check whether the data comes from the multivariate normal distribution, is 957.118 ($p < 0.001$) indicates that the responses to the scale items are factorability.

RESULTS

Structure valıdıty

To evaluate the construct validity of the Female Muscularity Scale, exploratory factor analysis, confirmatory factor analysis, item discrimination, and item-total correlation techniques were used.

Exploratory factor analysıs

Factor analysis is a statistical analysis performed to obtain evidence regarding whether the scale measures the structure it wants to measure or

not in scale development and adaptation studies. According to Buyukozturk et al. [17], factor analysis is an effort to explain the measured structure with the least number of factors by using variables that measure the same structure together. For this reason, to determine the factor loadings and factorability status of the items in the scale, exploratory factor analysis was performed. Before starting the exploratory factor analysis, the accuracy of the data was tested. Evaluations were made whether the data collected represented the sample or not.

There are different ideas about sample size in exploratory factor analysis. For example, Comrey and Lee [18]; state that 50 people are very good and 100 people are weak, 200 is medium, 300 is good, 500 is very good and 1000 is the perfect sample number. However, Tabachnick et al. [19] state that a large sample is not needed to obtain a high load value, therefore 150 people are sufficient. Another opinion belongs to Kline et al. [20]. According to Kline et al. [20], the sample size depends on relative criteria such as the number of items or factors, and the sample size should be 10 times the number of items.

Apart from these, another test evaluating the appropriateness of factor analysis to be made for sample size is Kaiser-Meyer-Olkin (KMO) [21]. High KMO means that each variable explains another variable perfectly. The values taken as the basis for evaluating the KMO test are as follows: The value between 0.50, 0.60 is bad, the value between .60 and .70 is weak, the values between .70 and .80 are medium, the values between .80 and .90 are good and .90 It can be interpreted that the values on it are in perfect conformity [22]. In this study, it is seen that the Kaiser-Meyer-Olkin value was calculated as .88. Accordingly, it can be said that the sample size is perfectly suitable for factor analysis. In addition, the results of the Barlett's test of sphericity, which was made regarding whether the data came from the multivariate normal distribution, were also interpreted (2=957.118; p=.000). Accordingly, Bartlett's test of sphericity results shows that although the data come from the multivariate normal distribution, it is suitable for factor analysis.

When performing factor analysis, whether all items in the scale are under the defined factor structure or not depends on the significance of the load value, which shows its relationship with that factor. Although there are still different opinions about the value that the item factor loadings should be, it is seen that it is preferred that this value should be .45 and above [20,17]. It is also known that this value is accepted up to .30. In this study on the Female Muscularity, factor loading was determined as .30. As a result of the factor analysis made with all items, there is a two-factor structure with an eigen value above 1. However, Lord [23]. In the first factor, the factor loading is high and the factor eigen value variance and factor eigen value it explains are high in parallel to this, whereas the similarity between the eigen values of the second factor and the next factor, if any, indicates unidimensionality, the opposite of this multidimensionality. Buyukozturk [24], on the other hand, as a piece of additional information, observing more than one sudden decrease after the first factor in the sloping plot of eigen values. The fact that there is a horizontal change afterward may prove that the scale has a factorial structure in the number of sudden decreases. Because the number of factors was determined as 2 in the analysis, there was no overlap. Therefore, the main elements that should be evaluate on Table 1 is the factor loading of the items. Accordingly, data breakpoint was accepted as 30. It has been observed that all items meet this acceptance. Table 1 is given, showing the factor load values, and then the scree plot was evaluated as additional evidence for this situation.

As seen in Table 1, the factor loadings of all items in the scale vary between .43 and .90. According to Kline [20], factor loadings between 0.30 and 0.60 indicate a medium level, and between 0.6 and 1 indicates a high level. However, the amount of variance explained by the two-factor structure is 68%. Especially in two-factor structures, according to Scherer, Wiebe, Luhter, and Adams [25]; the variance explained is between 40% and 60% in social sciences. In addition, the variance explained by the female muscularity scale is at an acceptable level. When the slope accumulation graph that supports this decision is examined; After the first point, the slope makes a plateau at two different points. In addition to this, as seen in Figure 1, it is seen that the eigen value of the two factors of the scale is above 1.

Table 1: Factor loadings.

	The Female Muscularity Scale	
	Attitude	Behavior
FMS4	0.902	
FMS3	0.863	
FMS5	0.718	
FMS1	0.676	
FMS2	0.633	
FMS6		0.862
FMS7		0.855
FMS9		0.747
FMS8		0.62
FMS10		0.43

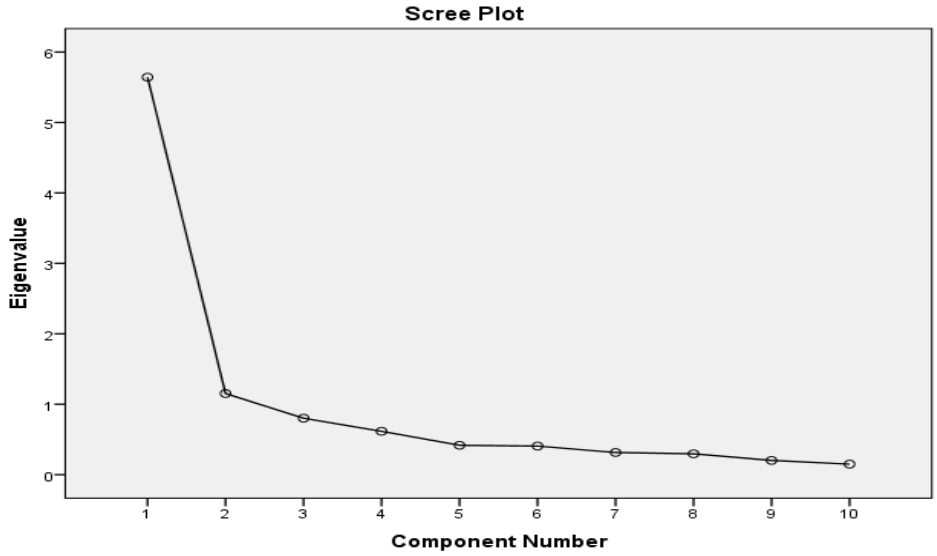

Figure 1: Slope plot graph.

CONFIRMATORY FACTOR ANALYSIS

Another analysis conducted to increase the validity evidence of the scale is the confirmatory factor analysis. Confirmatory factor analysis on 213 people was conducted with the knowledge that all items measure two different factors. The two-factor structure of the Female Muscularity Scale determined by the maximum possibility analysis was tested by CFA. To apply the maximum possibility method, there must be a certain hypothesis. This hypothesis should be provided by the size of the sample size, it should be ensured that the multivariate normality hypothesis is encounter and the variables are continuously variable. To apply the maximum possibility method, the scatter diagram matrix was examined to test the multivariate normality hypothesis and the distributions were found to be suitable for the multivariate normality [26]. A second element is a hypothesis that the normality distributions of the data are coincide. In this case, the skewness and kurtosis values were examined, and the skewness value was found to be 1.39, and the kurtosis value 1.50. According to Tabachnic et al. [19], the values of skewness and kurtosis in the range of -1.50 ± 1.50 indicate that the data show a normal distribution. In this study, CFA was performed after the hypothesis was provided. The researchers used different fit indices to evaluate the model's compatibility with the data. The most used fit indices are (χ^2, sd, (χ^2/sd, GFI, AGFI, NFI, CFI, SRMR, and RMSEA values. However, in this study, other fit indices were also included. The point that should be considered here is that the χ^2 value is sensitive to the sample size and as the sample size increases, they tendency to the difference will increase. The fit indices of the analysis are given in Table 2 in detail.

When the fit indices are examined in Table 2, it was found as χ^2=69.157, sd= 31, χ^2/df=2.231, GFI=0.936, AGFI=0.891, NFI=0.969, CFI=0.978, SRMR=0.026 and RMSEA=0.076. In addition, as a result of the maximum probability analysis, all

items in the scale were determined to have high Eigen values (Table 3).

As seen in Figure 2, explanation rates of the factor structure of the items is between 0.79 and 0.91.

ITEM ANALYSIS

Table 4 shows the correlations of all items in the scale related to the Attitude sub-scale. Accordingly, it was determined that the total item correlation in the scale was between 0.70 and 0.88 (p=0.000). According to this table, it can be interpreted that the validity of the items under one factor is medium and high.

Table 5 shows the correlations of all items in the scale related to the behavior sub-scale.

Table 2: Measurement model goodness of fit ındices.

Model fit indices	Value	Acceptable fit criteria	Perfect fit criteria
$\chi 2/\delta\phi$	2.231	2 ≤ χ 2 /sd ≤ 3	0 ≤ χ 2 /sd ≤ 2
AGFI	0.891	0.85 ≤ AGFI ≤ 0.90	0.90 ≤ AGFI ≤ 1.00
GFI	0.939	0.90 ≤ GFI ≤ 95	0.95 ≤ GFI ≤ 1.00
CFI	0.978	0.90 ≤ CFI ≤ 0.95	0.95 ≤ CFI ≤ 1.00
NFI	0.969	0.90 ≤ NFI ≤ 0.95	0.95 ≤ NFI ≤ 1.00
NNFI (TLI)	0.968	0.90 ≤ NNFI (TLI) ≤ 0.95	0.95 ≤ NNFI (TLI) ≤ 1.00
RFI	0.945	0.90 ≤ RFI ≤ 0.95	0.95 ≤ RFI ≤ 1.00
IFI	0.979	0.90 ≤ IFI ≤ 0.95	0.95 ≤ IFI ≤ 1.00
RMR	0.082	0.05 ≤ RMR≤ 0.08	0.00 ≤ RMR≤ .05
RMSEA	0.076	0.05 ≤ RMSEA ≤ 0.08	0.00 ≤ RMSEA ≤ .05
SRMR	0.026	0.05 ≤ SRMR ≤0.10	0.00 ≤ SRMR ≤ .05
PNFI	0.663	0.50 ≤ PNFI ≤ 0.95	0.95 ≤ PNFI ≤ 1.00
PGFI	0.674	0.50 ≤ PNFI ≤ 0.95	0.95 ≤ PNFI ≤ 1.00

Table 3: The female muscularity scale between sub-scale correlation matrix.

		Attitude	Behavior
Attitude	r	1	0.761**
	p		0
	n	213	213
Behavior	r	0.761**	1
	p	0	
	n	213	213

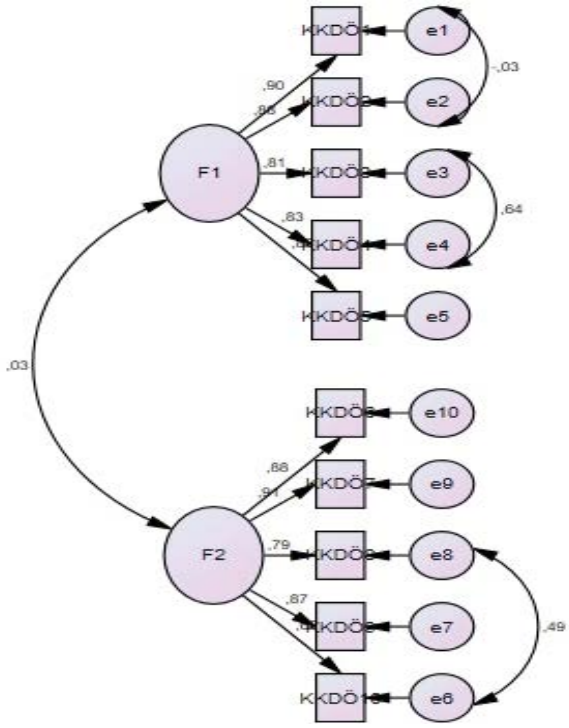

Figure 2: Explanation rates of the implicit value of the items.

Table 4: Item analysis results for sub-scale of attitude.

	FMS1	FMS2	FMS3	FMS4	FMS5
FMS1	1	0.791	0.712	0.753	0.751
FMS2	0.791	1,000	0.738	0.736	0.721
FMS3	0.712	0.738	1	0.88	0.659
FMS4	0.753	0.736	0.88	1,000	0.693
FMS5	0.751	0.721	0.659	0.693	1

Table 5: Item analysis results for sub-scale of behavior.

	FMS6	FMS7	FMS8	FMS9	FMS10
FMS6	1	0.799	0.704	0.76	0.526
FMS7	0.799	1	0.709	0.794	0.575
FMS8	0.704	0.709	1,000	0.702	0.723
FMS9	0.76	0.794	0.702	1	0.538
FMS	0.526	0.575	0.723	0.538	1

Table 6: Cronbach's alpha values for the female muscularity scale.

	Cronbach's Alpha	Number of items
Attitude	0.94	5
Behavior	0.92	5
Scale Total	0.83	10

Table 7: Test-retest values for the female muscularity scale.

The Female Muscularity Scale
r: 0.79
p: 0.000
n: 55
r: 0.82
p: 0.000
n: 55

Accordingly, it was determined that the total item correlation in the scale was between 0.53 and 0.80 (p=0.000). According to this table, it can be interpreted that the validity of the items under one factor is medium and high.

RELIABILITY

Cronbach Alpha reliability coefficient was evaluated to test the reliability of the scale. In the analysis, it was found that the reliability coefficient calculated for the two-factor structure was 0.94 in the attitude sub-scale of the scale and 0.92 in the behavior sub-scale. It is stated that the Cronbach Alpha reliability coefficient is between 0.70 and 0.80 has acceptable reliability, between 0.80 and 0.90 has a good level of reliability and if it is above 0.90 has a high level of reliability. In this case, it is possible to say that the reliability of the two-dimensional FMS scale is high (Table 6).

TEST-RETEST RELIABILITY

As a result of the correlation analysis performed in terms of test-retest reliability, it was found that the Female Muscularity Scale scores in women did not change in time (Table 7).

DISCUSSION

The study aims to test the validity and reliability of the Female Muscularity Scale. For this aim, the first exploratory factor analysis was performed for construct validity. Cronbach Alpha coefficients were examined to determine internal consistency. A two-factor structure, attitude and behavior, was determined according to the results of the Explanatory Factor Analysis conducted to determine the factor patterns of the items in the DMS. Two-factor structure determined as a result of exploratory factor analysis conducted to test the construct validity of the scale explain 68% of the variance. Sub-scale factor loadings of the original scale developed by Rodgers et al. [9] are between 0.74 and 0.91 in the "Attitude" sub-scale. In the "behavior" sub-scale, it varies between 0.80 and 0.929. Similarly, based on the findings and these results, we can say that the factor loadings of DMS are at an acceptable

level. At the same time, our findings Rodgers et al. [9] is in line with the findings obtained.

Internal consistency coefficients were calculated in testing the reliability of the scale. Internal consistency coefficients obtained for 213 participants were determined as 0.94 in the "Attitude" sub-scale and 0.92 in the "Behavior" sub-scale. Rodgers et al. [9], on the other hand, internal consistency coefficients of .93 in the attitude sub-scale and .90 in the behavior sub-scale were obtained. The reliability findings we have obtained as a result of our research Rodgers et al. [9] is in line with the findings obtained. These values are above the 0.60-0.80 values, which are expressed quite reliably by Alpar et al. [26]. Behavior sub-scale is below these values. However, although the item factor loadings are generally desired to be 0.45 and higher, items with a factor loading of 0.30 can also be kept in the scale [20,27,28]. In this case, we can say that the factor loadings and internal consistency coefficients of the DMS are at an acceptable level, according to the results we obtained, which are parallel to the findings in the literature.

The factor structure of the Female Muscularity Scale was also tested with CFA. Firstly, fit indices values were calculated for the model with two latent variables (factors) specified in the original scale. The fit indices, especially the x2/sd (2.231) value, indicate that the model has a good fit. Confirmatory factor analysis results to test the construct validity of the scale showed that the fit indices of the scale consisting of two sub-scale and a total of 10 items were at an acceptable level. When the obtained fit indices are compared with the good fit or acceptable fit indices values, it is seen that the model is within the measure of the good fit indices [29]. Fit indices and basic parameter estimates for the measurement model are compatible with the data of the model. These results are similar to the fit indices values of the original the Female Muscularity Scale developed by Rodgers et al. [9]. Rodgers et al. [9] calculated the fit indices values of the scale as a result of the analysis, he made in the participation of students studying at different universities of the United States, whose age range is 18-25; CFI=.97, GFI=.93, RMSEA=.08. Another finding is that the correlation and internal consistency results of the sub-scale of the scale are positive and significant. These results are in line with the findings obtained by Rodgers et al. [9].

CONCLUSION

In conclusion, the findings of the study revealed that the 10-item FMS is a scale that can be used to determine the muscular drive level of Turkish exercise female participants. This study is important in terms of introducing a new scale to the Turkish literature that will be used to determine the muscularity levels of female participants who exercises in the field of sports and exercise psychology. But it does contain some limitations. Although the results revealed sufficient psychometric properties for this participant group, studies for different samples and age groups are needed. In future studies, keeping the participant size high will provide more reliable information. In addition, in other studies, the fear of negative evaluation of the muscularity in women, body image, eating disorders, etc. Its relation to the subjects can be examined.

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REFERENCES

1. Thompson JK, Heinberg LJ, Altabe M, et al. Exacting beauty: Theory, assessment, and treatment of body image disturbance. Washington, DC: Am Psychol Assoc 1999.
2. Drewnowski A, Kurth C, Krahn D. Effects of body image on dieting, exercise, and anabolic steroid use in adolescent males. Int J Eat Disord 1995; 17:381–386.
3. McCreary DR, Sadava SW. Gender differences in relationships among perceived attractiveness, life satisfaction, and health in adults as a function of body mass index and perceived weight. Psychol Men Masculinity 2001; 2:108–116.
4. Cohn L, Adler N. Female and male perceptions of ideal body shapes: Distorted views among Caucasian college students. Psychol Women Quarterly 1992; 16:69–79.
5. Mishkind ME, Rodin J, Silberstein LR, et al. The embodiment of masculinity: Cultural, psychological, and behavioral dimensions. Am Behavioural Sci 1986; 29:545–562.
6. Edwards S, Launder C. Investigating muscularity concerns in male body image: Development of the swansea muscularity attitudes questionnaire. Int J Eat Disord 2000; 28:120–124.
7. Cohane GH, Pope HG. Body image in boys: A review of the literature. Int J Eat Disord 2001; 29:373–379.
8. Jacobi L, Cash TF. In pursuit of the perfect appearance: Discrepancies among self-ideal percepts of multiple physical attributes. J Applied Social Psychol 1994; 24:379–396.

9. Rodgers RF, Franko DL, Lovering ME, et al. Development and validation of the female muscularity scale. Sex Roles 2018; 78:18-26.
10. McCreary D, Sasse D. An exploration of the drive for muscularity in adolescent boys and girls. J Am College Health 2000; 48:297–304.
11. McCreary DR, Sasse DK, Saucier DM, et al. Measuring the drive for muscularity: Factorial validity of the drive for muscularity scale in men and women. Psychol Men Masc 2004; 5:49–58.
12. Wojtowicz AE, von Ranson KM. Psychometric evaluation of two scales examining muscularity concerns in men and women. Psychol Men Masc 2006; 7:56–66.
13. Yelland C, Tiggemann M. Muscularity and the gay ideal: Body dissatisfaction and disordered eating in homosexual men. Eat Behaviors 2003; 4:107–116.
14. Schaefer LM, Burke NL, Thompson JK, et al. Development and validation of the sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4). Psychol Assessment 2015; 27:54–67.
15. Robert CA, Munroe-Chandler KJ, Gammage KL. The relationship between the drive for muscularity and muscle dysmorphia in male and female weight trainers. J Strength Conditioning Res 2009; 23:1656–1662.
16. Brislin RW. Back-translation for cross-cultural research. J Cross Cultural Psychol 1970; 1:185-216.
17. Buyukozturk S. Data analysis handbook, 6th Edn, Ankara: Pegem A Publishing, 2006.
18. Comrey AL, Lee HB. Interpretation and application of factor analytic results. Comrey AL, Lee HB. A first course in factor analysis 1992.
19. Tabachnick BG, Fidell LS. SAS for windows workbook for Tabachnick and Fidell using multivariate statistics. Allyn and Bacon 2001.
20. Kline P. An easy guide to factor analysis. New York: Routledge 1994.
21. Kalayci S. SPSS applied multivariate statistical techniques. Ankara: Asil Yayin Dagitim 2005.
22. Leech NL, Barrett KC, George A. Morgan. SPSS for intermediate statistics: Use and interpretation 2005.
23. Lord CG. Schemas and images as memory aids: Two modes of processing social information. J Pers Soc Psychol 1980; 38:257.
24. Buyukoztur, S. Data analysis handbook for social sciences. Ankara: Pegem A Publishing 2007.
25. Scherer RF, Luther DC, Wiebe FA, et al. Dimensionality of coping: Factor stability using the ways of coping questionnaire. Psychol Reports 1988; 62:763-770.
26. Cokluk O, Sekercioglu G Buyukozturk S. Multivariate statistics for social sciences: SPSS and Lisrel Applications, 2016.
27. Alpar, R. Practical statistics for sport science. 2001; 2:35-70.
28. Tabachnik BG, Fidell LS. Using multivariate statistics. 2nd Edn Newyork: Harper & Row 1989.
29. Schermelleh-Engel K, Moosbrugger H, Muller H. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. Methods Psychol Res Online 2003; 8:23-74.